

# EXHIBIT E

# EXHIBIT A

**IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF TEXAS  
WACO DIVISION**

GESTURE TECHNOLOGY PARTNERS,  
LLC,

Plaintiff

v.

APPLE INC.

Defendant.

**JURY TRIAL DEMANDED**

C.A. NO. 6:21-cv-00121-ADA

GESTURE TECHNOLOGY PARTNERS,  
LLC,

Plaintiff

v.

LENOVO GROUP LTD., LENOVO (UNITED  
STATES) INC., and MOTOROLA MOBILITY  
LLC,

Defendants.

**JURY TRIAL DEMANDED**

C.A. NO. 6:21-cv-00122-ADA

**EXPERT DECLARATION OF BENEDICT OCCHIOGROSSO IN SUPPORT OF  
PLAINTIFF'S OPENING CLAIM CONSTRUCTION BRIEF**

I, Benedict Occhiogrosso, do hereby make the following declaration:

**I. INTRODUCTION**

1. I have been retained by Williams, Simons, & Landis, PLLC (hereinafter “WSL”), to provide various opinions regarding U.S. Patent Nos. 7,933,431 (the “’431 Patent”); 8,194,924 (the “’924 Patent”); 8,878,949 (the “’949 Patent”); and 8,553,079 (the “’079 Patent”) (the “Asserted Patents”). I understand that my declaration is being submitted in connection with Plaintiff Gesture Technology Partners LLC’s (“Plaintiff” or “GTP”) Opening Claim Construction Brief. Unless otherwise noted, the statements made herein are based on my personal knowledge and, if called to testify with regards to this declaration, I could and would do so competently and truthfully.

2. My analysis and basis for my opinions are set forth below. I reserve the right to supplement or amend my analysis, conclusions, and any opinions I make this declaration in response to claim construction positions and opinions expressed by Defendants Apple Inc., and Lenovo Group LTD., Lenovo (United States) Inc., and Motorola Mobility LLC’s (collectively, “Defendants”) witnesses, or in light of any additional evidence, testimony, discovery, or other information that may be provided to me after the date of this declaration.

3. I make this declaration pursuant to the Agreed Scheduling Order<sup>1</sup> and the Standing Order Governing Proceedings – Patent Cases signed October 8, 2021. But I note that Defendants have not provided sufficient notice of the reasoning behind their proposed constructions, including why certain claim terms are allegedly indefinite. Therefore, I reserve my right to supplement my opinions in response to Defendants’ positions when they are provided.

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<sup>1</sup> *Gesture Technology Partners, LLC, v. Apple Inc.*, C.A. NO. 6:21-cv-00121-ADA, Dkt. No. 22; *Gesture Technology Partners, LLC, v. Lenovo Group LTD., Lenovo (United States) Inc., and Motorola Mobility LLC*, C.A. NO. 6:21-cv-00122-ADA, Dkt. No. 30.

4. I have been retained in this matter by WSL as a technical expert in the field of electrical communications engineering and human-computer interaction. I am being compensated for my work in this matter at my usual and customary rate. I am also being reimbursed for all reasonable expenses that I incur during the course of this work. My compensation does not depend upon the results of my analysis or the substance of my testimony. Nor does my compensation depend on the outcome of this litigation or any related proceeding, and it is not based on the result of any issue in this litigation. I have no personal interest in the outcome of this litigation.

## **II. BACKGROUND AND QUALIFICATIONS**

5. Provided below is a summary of my educational background, career history, and publications. My curriculum vitae is attached as Exhibit A to this declaration.

6. I hold a Bachelor of Science Degree in Electrical Engineering as well as a Master of Science Degree in Electrical Engineering, both from the Polytechnic Institute of Brooklyn (now part of New York University).

7. I have authored or co-authored nearly three dozen articles in peer-reviewed journals, conference proceedings, texts, industry trade publications, and monographs. These publications span a range of topics including Integrated Voice–Data Communications/Switching, Integrated Packet-Circuit Switching, Voice Digitization, Packet Voice, Indoor Wireless distribution, Disaster Recovery and Business Continuity, Data Center Engineering, Switching Processor Architecture, Telephone and Voice Mail Systems, PBX & LAN switching premises-based systems and related technologies and Internet of Things (IoT).

8. I have more than 40 years of telecommunications and information technology experience. I am the co-founder and President of DVI Communications Inc., a telecommunications and information technology and business consulting firm. Since the establishment of DVI in 1979,

I have planned, designed, implemented, and managed large-scale projects involving wired and wireless communications systems, which included transmission of voice and data. Prior to founding DVI and for several years thereafter, I held a Department of Defense security clearance and worked on several classified programs within the defense industry, where I supported the development of several pioneering technologies that have served as the prototypes for many telecommunications and IT systems later utilized in commercial practice.

9. I have extensive expertise in voice-data-video switching, and transmission systems deployed in networks, including both circuit switching and packet switching using wireline and wireless distribution methods (including Land Mobile radio, Satellite, microwave, cellular and Wi-Fi). In addition, I have developed various applications systems including voicemail, e-mail, unified messaging, and audio/video recording for a variety of facility types including call-contact centers, data centers, trading floors, and mission-critical communications centers. At present, my primary responsibilities encompass strategic planning and systems design of client IT Infrastructures and program management for major projects undertaken by DVI.

10. With respect to wireless communications, I am knowledgeable in transceiver architecture and design (including RF and baseband systems), operating over various channels subject to different types of performance degradation (including noise, multipath, rainfall, etc.). I have designed and deployed numerous wireless communications systems over the course of my career operating at UHF, microwave and millimeter wave frequencies supporting several applications including voice / data/ video telecommunications, Automatic Vehicle Location (AVL), SCADA and telemetry in both outdoor and indoor settings. I am knowledgeable in modulation techniques, error correction /error detection coding and related signal processing used in transmission and reception supporting Land Mobile Radio, Cellular (from AMPS through 5G)

and Wi-Fi (different vintages) . as well as satellite and microwave. Among the clients I have supported over the years included DARPA Packet Radio network (PRNET) technology for survivable networks, Xerox's pioneering XTEN Network (Microwave bypass (10.5 GHz) used as an alternative to Telco local loops), United Nations (multi-location C-band earth stations in a voice – data – fax network), TVRO applications for Bertelsmann BMG, Citicorp's Ku- band CitiSATCOM network for data and video distribution, a major Financial Exchange's low latency network for high frequency trading using cascaded microwave links, and NYC Transit's 700/800 MHZ regional Bus radio System comprising 36 base stations supporting a fleet of 6000 + revenue producing vehicles for CAD/AVL, Fleet management and Dispatch- to- Operator communications.. I have served as both a consulting and/or testifying expert in several cases enumerated in my CV. I have extensive experience in cellular voice/ data communications technology and have supported multiple sides of the industry including Service Providers such as Sprint/Nextel Wireless, AT&T Wireless, Vonage, Rebtel.; Equipment Manufacturers including Kyocera, Apple, Ademco, Nokia, M/A-com, Partech and Licensing. entities such as ASCAP (in their critical review of cellular technology).

11. With respect to video, I have supported several clients in video distribution – (for broadcast industry clients - BMG, Gannett, WNET 13), video surveillance (for clients -NYC SCA, MTA PD, NYC DoT), and video compression / encoding in the context of Audio – Video Distribution and Video conferencing (for clients war rooms/ board rooms :Nassau Count Govt. operations, MTA, NFL , AIG)\. I am very familiar with the underlying technology of these systems including camera technology, video recording, digital video compression / signal processing (codecs supporting various algorithms), selected image processing and video analytics applications as well as the full gamut of network distribution methods (ranging from traditional

matrix switching to video over IP).

### **III. RELEVANT LEGAL PRINCIPLES**

12. I understand the parties have proposed a number of claim terms and phrases for construction by the Court, and that the parties have offered competing proposed constructions for these claim terms and phrases. In the sections that follow, I offer my opinions as a person of ordinary skill in the art on the construction of certain of these claim terms and phrases.

13. For the purposes of this report, I have been informed about certain aspects of the law that are relevant to my analysis and opinions. I have applied these legal principles in rendering my opinions below.

#### **A. Ordinary and Customary Meaning of a Claim Term**

14. I understand that the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention. I understand the time of the invention to be sometime between 1998 at the earliest and 1999. I understand that in the absence of an express intent on the part of the inventor to give a special meaning to the claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by a person of ordinary skill in the art.

15. I understand that the basis for a term's ordinary and customary meaning may be derived from a variety of sources, including the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art at the time of the invention.

16. I have been instructed that dictionary definitions or definitions from technical references can be used to inform or confirm the ordinary and customary meaning of words found in a claim, but that in construing claim terms, the general meanings gleaned from reference sources,

such as dictionaries, must always be compared against the use of the terms in the context of the claim itself.

17. I understand that a patent applicant is entitled to be his or her own lexicographer (in other words, provide his or her own meaning to a word or phrase) and may rebut the presumption that claim terms are to be given their plain and ordinary meaning. To do so, the applicant must clearly set forth a definition of the term that is different from its ordinary and customary meaning. Where the applicant provides an explicit definition for a term, that definition will control interpretation of the term as it is used in the claim in which it appears. I understand that the specification can also be relied on for more than just explicit lexicography to determine the meaning of a claim term. For example, I understand that the meaning of a particular claim term may also be determined by implication, that is, according to the usage of the term in the context of the specification.

**B. 35 U.S.C. Section 112, Paragraph 6**

18. I have been informed that a patent claim may be expressed using functional language. I have further been informed that Section 112, Paragraph 6, provides that a structure may be claimed as a “means . . . for performing a specified function.” There is a rebuttable presumption that Section 112, Paragraph 6 applies when the claim language includes “means” or “step for” terms, and that it does not apply in the absence of those terms. The presumption stands or falls according to whether one of ordinary skill in the art would understand the claim with the functional language—when read in the context of the specification and figures—to denote sufficiently definite structure for performing the function. However, I also have been informed that when reading and understanding claim language, one should not import limitations from the specification into the claim language.

19. I have also been informed that construing a claim limitation under Section 112, Paragraph 6 is a multi-step process. After it has been determined whether or not Section 112, Paragraph 6 applies, first, a determination is made as to what the function of the claim term is, and second a determination as to what structure in the specification performs that function, and what any equivalents of that structure may be.

**C. Level of Skill in the Art**

20. I was asked to provide my opinion about the experience and background a person of ordinary skill in the art (“POSITA”) of the ’431 Patent would have had as of July 8, 1999.

21. With respect to the ’431 Patent, a POSITA in the art related to the technology of the ’431 Patent as of July 8, 1999 would have had a bachelor’s degree in Electrical Engineering, Computer Engineering, or an equivalent field, and at least two years of experience working in the field of human-computer interaction. This POSITA would have had knowledge of design considerations known in the industry, would have been familiar with then-existing products and solutions, and would have understood how to search available literature for relevant publications. Additional experience in the industry or academia may have taken the place of education and vice-versa.

22. I believe that based on my experiences outlined above, I can opine today about what those of skill in the art would have known and understood as of July 8, 1999.

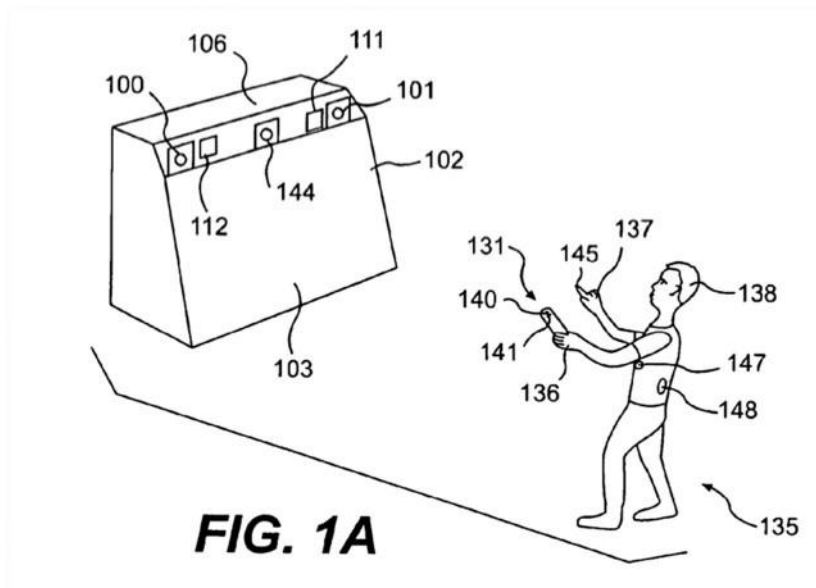
**IV. OVERVIEW OF U.S. PATENT NO. 7,933,431**

23. U.S. Patent No. 7,933,431 (the “’431 Patent”) is entitled “Camera Based Sensing In Handheld, Mobile, Gaming, Or Other Devices.” I have been informed by counsel that this patent has a priority date of July 8, 1999.

29. The ’431 Patent is directed towards methods and apparatuses “to enable rapid

TV camera and computer-based sensing in many practical applications, including, but not limited to, handheld devices, cars, and video games.” ’431 Patent, Abstract. The claims of the ’431 Patent relate in general to “input devices for computers, particularly, but not necessarily, intended for use with 3-D graphically intensive activities, and operating by optically sensing a human input to a display screen or other object and/or the sensing of human positions or orientations.” ’431 Patent, 2:7-11.

30. The ’431 Patent describes the use of computer devices and one or more cameras that “optically sens[e] human input” with applications in a “variety of fields such as computing, gaming, medicine, and education.” ’431 Patent, 2:7– 17. In general, the ’431 Patent discloses numerous applications in which a user or an object held by a user control a computer with one or more cameras as depicted in Fig. 1A below:



’431 Patent, Fig. 1A. In this embodiment, there are multiple cameras (100, 101, 144) located on around a monitor (102) with a screen facing a user (103) and connected to a computer (106). ’431 Patent, 3:23-52.

31. The ’431 Patent also discloses a handheld device, such as a cell phone, that

processes imaging from a person or object to control functions on the handheld device. '431 Patent, 11:62:-67. The '431 Patent describes that the handheld device can “perform a control function by determining [] position, orientation, pointing direction or other variable with respect to one or more external objects, using an optical sensing apparatus . . . or with a camera located in the handheld device, to sense datums or other information external for example to the device.” '431 Patent, 12:1-9. The '431 Patent describes that the device is able to “acquire features of an object and use it to determine something” such as object recognition. '431 Patent, 13:5-21.

## V. OPINIONS REGARDING CLAIM CONSTRUCTION

32. I understand the parties have proposed a number of claim terms and phrases for construction by the Court, and that the parties have offered competing proposed constructions for these claim terms and phrases. In the sections that follow, I offer my opinions as a person of ordinary skill in the art on the construction of certain of these claim terms and phrases.

### A. '431 Patent Claim Terms

33. I have been asked by counsel to provide opinions regarding the following disputed claim terms of the '431 Patent.

#### 1. **computer means within said housing for analyzing said image to determine information concerning a position or movement of said object”**

GTP	Defendants
<p>No construction necessary. Not governed by 35 U.S.C. § 112 ¶ 6.</p> <p>Alternatively, if the Court finds this term is subject to 35 U.S.C. § 112 ¶ 6: Structure: A computer. Function: “analyzing said image to determine information concerning a position or movement of an object”</p>	<p>Means-Plus-Function Term</p> <p><b>Function:</b> “analyzing said image to determine information concerning a position or movement of said object”</p> <p><b>Structure:</b> A computer programmed to (1) scan the pixel elements in a matrix array on which said image is formed, and then calculate the centroid location “x,y” of a target on the object using the moment method disclosed in U.S. Patent No. 4,219,847 to Pinkney, as disclosed at</p>

	4:48-62; (2) add or subtract said image from prior images and identify movement blur, as disclosed at 6:64-7:14, 7:22-29; (3) obtain a time variant intensity change in said image from the detected output voltage from the signal conditioning of the camera means or by subtracting images and observing the difference due to such variation, as disclosed at 8:25-38; or (4) detect a change in color reflected from a diffractive, refractive, or interference based element on said object that reflects different colors during movement, as disclosed at 8:60-9:14.
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34. I have been asked to opine whether the term “computer means within said housing for analyzing said image to determine information concerning a position or movement of said object” recites sufficient structure to a POSITA for performing the recited function. The recited function is “analyzing said image to determine information concerning a position or movement of said object.” In my opinion, this term recites sufficient structure to a POSITA for performing the recited function. A POSITA would understand the term “computer means” to be a computer. A “computer” is a well-known term and denotes specific structure to a POSITA. I base my opinions on my expertise and understanding of the knowledge of a POSITA at the time of the invention, the claim language itself and the teachings of the specification. Moreover, the surrounding claim language recites functionality that a POSITA would associate with a computer, namely analyzing and determining. Thus, in my opinion the claim language including the use of the word “computer” before the word means coupled with the functional language of the claim provides sufficiently definite structure for one of skill in the art to understand what is being claimed and the structure required to perform the recited function. My opinions and understanding are also supported by the teachings of the specification that provide examples analyses and determination being performed by a computer. Such examples can be found at Abstract, 2:7-13, 2:20-23, 3:15-33, 4:56-62, 6:1-

19, 6:27-32, 7: 22-29, 7:55-76, 12:42-64, 13:8-15, 14:45-51, 16:1-17, 17:34-50, 19:16-34, 23:66-24:7, 24:35-50, FIGS. 1A.

35. I have also been asked to opine on the corresponding structure for this term if the Court determines that it should be construed according to pre-AIA 35 U.S.C. § 112, ¶6. I understand that the recited function for this term is analyzing said image to determine information concerning a position or movement of said object.”

36. It is my opinion that “a computer” is the structure disclosed and clearly linked in the specification for performing the recited function. For example, the specification describes “a combination of one or more TV cameras (or other suitable electro-optical sensors) and a computer to provide various position and orientation related functions of use.” ’431 Patent at 11:55-58. In another example, a computer is describes as analyzing images to determine the position and/or orientation of a cell phone. *Id.* at 12:42-56.

37. I understand that a computer can be sufficient structure for functions that can be performed by a general purpose computer. Here, the recited functions are analyzing and determining, which are functions that can be performed by a general purpose computer. That is why it is my opinion that a computer is sufficient structure for performing the recited function.

38. I understand that Defendants contend that the corresponding structure is “A computer programmed to (1) scan the pixel elements in a matrix array on which said image is formed, and then calculate the centroid location ‘x,y’ of a target on the object using the moment method disclosed in U.S. Patent No. 4,219,847 to Pinkney, as disclosed at 4:48-62; (2) add or subtract said image from prior images and identify movement blur, as disclosed at 6:64-7:14, 7:22-29; (3) obtain a time variant intensity change in said image from the detected output voltage from the signal conditioning of the camera means or by subtracting images and observing differences

due to such variation, as disclosed at 8:25-38; or (4) detect a change in color reflected from a diffractive, refractive, or interference based element on said object that reflects different colors during movement, as disclosed at 8:60-9:14.” I disagree. Defendants’ corresponding structure contains structure that does not correspond to the recited function. For example, scanning the pixel elements in a matrix array on which the image is formed pertains to capturing the image. In another example, obtaining intensity signals based on output voltage from the signal conditioning means of a camera pertains to image capture, not analyzing the image. Additionally, it is my understanding that the corresponding structure should be that which is necessary to perform the recited function. Here the recited function is “analyzing said image to determine information concerning a position or movement of said object.” Some of the cited functionality by Defendants is not “necessary” to perform the recited function of analyzing said image to determine information. Rather, the additional limitations imposed by Defendants’ proposal address the types of data that may be analyzed but not the structure for analyzing that data. That structure is a computer.

**2. “means for controlling a function of said apparatus using said information”**

GTP	Defendants
<p>This term is governed by 35 U.S.C. § 112 ¶ 6</p> <p><b>Function:</b> “controlling a function of a handheld computer apparatus using information concerning a position or movement of at least one object positioned by a user operating said object”</p> <p><b>Structure:</b> “a control system programmed to control a function based on information concerning a position or movement of said object; and equivalents thereof.”</p>	<p>Means-Plus-Function Term</p> <p><b>Function:</b> “controlling a function of a handheld computer apparatus using information concerning a position or movement of at least one object positioned by a user operating said object”</p> <p><b>Structure:</b> Indefinite.</p>

39. I understand that the parties agree that this term should be construed according to

pre-AIA 35 U.S.C. § 112, ¶6. I understand that the recited function for this term is “controlling a function of a handheld computer apparatus using information concerning a position or movement of at least one object positioned by a user operating said object.”

40. It is my opinion that “a control system programmed to control a function based on information concerning a position or movement of said object; and equivalents thereof ” is the structure disclosed and clearly linked in the specification for performing the recited function. The specification describes the invention in terms of camera capabilities and their effect on the ability to control different devices through a control system. *See* ’431 Patent at 5:50-60. Specifically, the ’431 Patent states that “[t]his has major ramifications for the robustness of control systems built on such camera based acquisition, be they for controlling displays, or machines or whatever.” *See id.* at 5:57-60. The control system described in the specification is associated with a camera, and is used to control “displays, or machines or whatever.” *Id.* This mirrors the language of claim 7 and the recited function: The camera means and means for controlling are in the same handheld computer apparatus, so the control system is associated with the camera. And the control system is used for controlling a function of that apparatus.

41. I understand that Defendants contend that this term is indefinite because the specification does not disclose any corresponding structure. I disagree because, as I opined above, “a control system programmed to control a function based on information concerning a position or movement of said object; and equivalents thereof ” is the structure disclosed and clearly linked in the specification for performing the recited function. It is also my understanding that Defendants and their expert have not set forth their reasoning for why they believe this term is indefinite. I reserve my right to amend my opinions based on the opinions rendered by Defendants’ expert for this term.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct. Executed on November 12, 2021 .

Dated: November 12, 2021

A handwritten signature in blue ink, appearing to read "Benedict Occhiogrosso", with a long horizontal flourish extending to the right.

Benedict Occhiogrosso

# EXHIBIT A



## Benedict Occhiogrosso

### Curriculum Vitae

#### Professional Summary

Mr. Occhiogrosso is recognized in the field of Telecommunications and Information Technology. His expertise encompasses a broad range of technical and managerial disciplines including voice communications, data networking, carrier services for public/private switched & dedicated networks, image processing, wireless and cable transmission systems, security systems including intruder detection, access control and video surveillance as well as operational and strategic planning. As co-founder and President of DVI Communications, Inc. he is responsible for overseeing corporate operations and providing executive level direction on strategically significant projects. During the course of his career, he has worked for various organizations in a consultative, design/engineering and managerial capacity. He has supported numerous clients with respect to technology consulting in the financial services, high technology, legal, corporate, health care and education sectors. His technical practice presently encompasses Strategic Planning and Expert Witness litigation support. Earlier in his career, he worked in the military aerospace industry developing strategic and tactical command and control systems for various agencies in the defense and intelligence communities.

#### Expertise

- |  |   |
|--|---|
| ▪ Automated out dialing systems  | ▪ Packet Switching /Internet Protocol             |
| ▪ Access control systems   | ▪ Packet Speech / Voice over IP                   |
| ▪ Automatic Call Distribution (ACD) & Interactive Voice Response (IVR) | ▪ Satellite communications                        |
| ▪ Cabling & Wire-based systems   | ▪ Telephone switching systems                     |
| ▪ Cellular telephony   | ▪ Video Surveillance Systems & video Digitization |
| ▪ Intrusion detection systems  | ▪ Voice digitization/voice processing             |
| ▪ LOS Microwave Systems  | ▪ Voice messaging                                 |
| ▪ Mission - Critical Infrastructure Design for Data Centers            | ▪ Wireless Communications Systems                 |
| ▪ Mobility management  |   |
| ▪ Packet Radio   |   |

**Benedict Occhiogrosso**

## Curriculum Vitae

**Education**

<u>Year</u>	<u>College or University</u>	<u>Degree</u>
1975	Polytechnic Institute of Brooklyn	MS, Electrical Engineering
1975	Polytechnic Institute of Brooklyn	BS, Electrical Engineering

**Enterprise Consulting Engagements**

Mr. Occhiogrosso has been affiliated with DVI Communications since 1979, below are significant consulting engagements for which he has served as Principal-in-Charge and/or Project Manager.

- **Bertelsmann - New York, NY** (1992- 1994)

Mr. Occhiogrosso led the DVI team that provided planning, design, procurement and implementation management services associated with the “fast-track” relocation of 2,400 employees and 6 corporate subsidiaries into a new 900,000-sq. ft. office tower. A Northern Meridian telephone switch supporting 3,000 users, Satellite antenna farm, high speed LAN and Cat 5 cabling plant was deployed. Our services covered voice/data communications and video network infrastructure, data center design and rooftop satellite communications.

- **Bear Stearns & Co., New York, NY** (1999-2002)

Mr. Occhiogrosso served as DVI's Principal-in- charge and Lead designer supporting the design, engineering acquisition and implementation management of a 1500 position trading floor and an 8,000 plus Centrex replacement for Bear Stearns' new world headquarters. The floor employed dual handsets, digital recording, VOIP, global hoot n' holler and traditional intercom with CTI hookups to application processors. IPC IQMX (IP turrets) with a Racal Tienna (all-digital, disk based/recording systems were deployed.

DVI had provided the project management and voice technologies consulting for the design, engineering and acquisition of all Back Office Voice, and Trader Voice, Communications Systems for BSC's new headquarters. This included: 8,000+ lines metro area switching system, a 5000+ user unified messaging system, as well as conferencing, intercom, paging and wireless systems. Systems examined included leading edge technologies from Lucent and Nortel as well as Verizon's Centrex offering. A massive research effort was mobilized in order to specify the major telecommunications systems to be purchased for the new headquarters building at 383 Madison Avenue. As part of developing the new Voice Technology for Bear Stearns HQ, DVI also contributed to the installation of a Demonstration and Test lab at Bear Stearns. DVI coordinated support from IPC, Bell, Lucent and Nortel. DVI furthermore managed the implementation and installation of two PBX's, Nortel 81C and a Nortel Meridian1 (Option 11c), IPC Tradenet MX Alliance system and Octel and Call Pilot voicemail, as well as the installation of a QSIG interface between IPC, Lucent, and Nortel. The installation consisted of managing the scope of the project, as well as supervising the various Trades (electricians, IPC, cabling) for the installation of PBX's, Trunks, Lines (T1, E1 and PRI's), phone sets, voicemail, and supervising and coordinating the demonstration of voice products for BSC's management and IT personnel. DVI also contributed to the

## Benedict Occhiogrosso

### Curriculum Vitae

Installation of two Unified Messaging solutions, Octel and Call Pilot. Octel was installed as a separate system, isolated from the BSC environment. The Nortel Unified Messaging was installed and rolled out to test users in the BSC environment.

- **City University of New York, College of Staten Island** (1990-1997)  
Mr. Occhiogrosso served as project executive where DVI provided systems engineering, design, and procurement and implementation services in conjunction with the development of the College's new 19 building Willowbrook campus. This encompassed all voice, data, and video communications systems, inter/intra-building cabling, and radio and telemetry systems for the campus. The systems deployed support over 12,000 students and essential operations including administrative and academic computing, registration, finance, departmental, library, media/educational center, building and grounds. The systems designed and acquired included cabling, fiber backbone, LANs, telephone switch and data communications servers. Three (3) AT&T Definity G3s with Audix supporting over 2,000 extensions were deployed. DVI was also responsible for developing a technology implementation and transition plan for the relocation and consolidation of the College's previous campuses to the new campus.
- **Brooklyn Union Gas** (1989- 1992)  
Mr. Occhiogrosso oversaw the analysis, design and engineering, selection for all voice (PABX/ACD/VRU), cabling and data communications for the new headquarters complex at Metrotech. This encompassed BUG's general office as well as the command-control System Control Complex which employed specialized LAN, video and process control telemetry data. An AT&T Definity G3i System supporting Audix voice mail and ACD were deployed. The Melita automated outdialler for credit collection was also deployed.
- **Société Générale - New York, NY** (1993-1995)  
In conjunction with the relocation of the Bank's U.S. headquarters to a new 350,000-sq. ft. office, DVI provided a full suite of telecommunications consulting services. The project involved the needs assessment, design, selection and implementation of technology for the bank's 300+ position trading floor (Etrali turrets/Triarch ITP), data networks (LAN/WAN), voice communications (PABX, voice mail), market data services and premises cabling infrastructure.
- **Roswell Park Cancer Institute – Buffalo, NY** (1992-1997)  
Mr. Occhiogrosso as project director, provided project planning, design, engineering, and procurement and implementation management services in support of the modernization of this nationally recognized cancer care center. The complex, consisting of an 18 building campus, underwent a \$241MM modernization, which included a state-of-the-art telecommunications network interconnecting the complex with a new telephone/voice mail system (NTI), in-building wireless telephony and high-speed local area networking. These systems were designed to support a new 180 bed hospital, new lab/vivarium complex, several renovated buildings, bed side computing and high resolution medical imaging transmissions.
- **Citibank - New York, NY** (1979- 2000)  
Mr. Occhiogrosso served as project manager, project principal and lead investigator for DVI's efforts in support of Citicorp. DVI designed and procured a multi-node N.Y. City wide voice

## **Benedict Occhiogrosso**

### Curriculum Vitae

communications system supporting over 20,000 lines (Citipax). This distributed system replaced several large existing PBXs as well as Centrex service based upon digital central office technology. Three NTI SL-100s were deployed to serve five locations. This included the tower at Court Square, LIC (1.1 MM sq. ft.). This system was expanded to include an 8000-user voice Messaging system (VMS). DVI supported feasibility, economic and requirements analyses as well as the design, engineering and implementation support for Citipax. DVI also performed a detailed disaster recovery plan/vulnerability analysis.

In addition to the Citipax PABX system, Mr. Occhiogrosso had also supported numerous diverse projects for Citicorp, including:

- Analyzed and improved the performance of a large-scale international message switching system (Citiswitch II), which supports numerous EFT applications. He subsequently participated in a task force to redesign Citibank's international message switching network.
- Specified and supported the design of an international packet switching network (CitiWIN) that integrated numerous Citibank applications and is deployed in some ninety (90) countries.
- For the domestic banking group, supported the analysis and design of home services offering advanced banking and investment services to customers in the privacy of their homes.
- For NYBOPS, analyzed alternate disaster recovery strategies for a multi-site ACD, including the Rockwell System and Periphonics VRU.
- For CitiSatcom, supported the complete procurement cycle for Citibank's VSET network deployment.
- He also supported several new business ventures including: DTS (Digital Transmission Services), FM subcarrier information service distribution and Videotex.
- He also provided ongoing technological consultation to Citibank in the areas of protocol conversion, digital PABX's and Local Area Networks.

Mr. Occhiogrosso has continued to support several consulting clients. A summary of consulting projects as follows:

For ***Capital One Financial*** (2004-2005), Glen Allen VA a Credit Card Processing concern, he performed analysis and design of replacement VoIP technology for Cap One's existing voice communications systems in its HQ, front and back offices and call/ contact centers at multiple corporate campuses. This included PBX, voice mail, ACD and examined both premises-based systems as well as managed service alternatives.

For ***Medical & Health Research Associates (MHRA)*** (2005-2007), NY, he designed and selected the PBX, Voice mail, Access control, Video Surveillance and Telecommunications Services which support their new HQ operations.

For ***Montclair State University*** (2006-2008), Montclair NJ as part of their Campus IT Infrastructure Upgrade, he performed a critical design review of the new Fiber Optic Backbone Cabling and Transmission Systems

## Benedict Occhiogrosso

### Curriculum Vitae

For the *NYC School Construction Authority* (2005-2007), to Enhance Physical security at dozens of Elementary & intermediate Public Schools in NYC, he headed up a Quality Assurance team which evaluated the Digital Video over IP Surveillance systems installed. The system employed analog cameras, video codecs, LAN distribution and video compression, motion detection and image processing.

For *SES Americom* (2005 –2009), Princeton NJ, he provided consulting services for Telecommunications Systems upgrades and New Service Introduction.

This included: VoIP System design and deployment for the Maritime Mobile Broadband service, Encrypted IPTV, and a future Ka-band Satellite Communications system.

For the *Port Authority of NY & NJ* (2007), he provided consulting services for Strategic Plan for VoIP Migration & Financial Analysis of both premise-based and managed services to support 12,000+ users.

For the *NYC Transit Authority, MTA* (2007-2015), he is the Principal –in –charge of a major project to replace and upgrade the Radio System which presently serves 5000 buses, 1000 support vehicles and hundreds of portable users throughout NYC, the edge of NJ and parts of Westchester. The system operates at 800 MHz will use Digital TDMA Radios and will also deploy over 2 dozen new base stations( with wired and microwave backhaul) as well as a state-of-the-art Command & Dispatch center (manned 7/24) with full security and back-up. All buses will support 2-way communications, Automatic Vehicle Location and Tracking and emergency Notification system.

For *Governors Island* (2008 -2011), he developed the Island-wide Telecommunications, IT and Security infrastructure which encompasses 2-way digital radio, telephone and data switching, fiber optic and copper cabling plant, video surveillance and perimeter security system, master security console, Audio – visual subsystems and wireless backhaul to support Island operations as well as that of future prospective tenants.

## Research & Development

For DARPA (1976-1979), Mr. Occhiogrosso supported research into packetized voice communications and integrated packet –circuit switching systems of voice, data and wideband applications. He also supported the analysis and design of low-bit rate vocoders with cryptosystems in shared user networks (mixed satellite and terrestrial) for survivable communications (pre-post and trans-attack).

Among the other Military C3I systems he worked on included:

- Marine Integrated Fire and Air Support System (MIFASS) for Navalex and USMC (1979-1982)
- Landing Force Integrated Communications System (LFICS) for Navalex and USMC (1981-82)
- Position Location Reporting System (PLRS) for USA/USMC (1980-82)
- Digital Communications Terminal (DCT) for USA(1982)
- AUTODIN II (for Defense Communications Agency (DCA) (1976-78)
- SORAK (for USAF, on behalf of Republic of South Korea) (1982)
- ULCS/ULMS (Unit Level Circuit and Message Switches) for Tri-Tac (1976-1978)
- JTIDS (Joint Tactical Information Distribution System) for USAF (1977)
- Integrated Local Regional Access Network (ILRAN) for DCA (1976-7)
- Several classified initiatives (1975-79)

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For DVI Communications internally and under development to TIE/Communications (1982-1986), Mr. Occhiogrosso led an engineering development team which developed a Store-and-Forward voice messaging system, the Speech Message Switch (SMS) for integrated use with TIE's voice-data PABX and standalone use for general industry. Product development encompassed hardware, component selection, circuit design, PC layout fabrication and testing, as well as software: specification, coding, debug and test.

For Xerox Corporation (1977-79), Mr. Occhiogrosso served as the Program Manager for a major support effort to develop a distributed satellite and microwave-based nationwide network (XTEN), providing advanced communications features to the business community, including: electronic document distribution, high speed data communications, communications security, and video teleconferencing. He was responsible for technical activities in the areas of system architecture and design, communications protocol development and implementation, security architecture, system service specifications, and simulation model development for traffic loading and performance evaluation.

### Wireless Experience

He has also supported numerous radio communications/wireless systems technologies including: Satellite (C- and Ku-band), LOS Microwave (4-40 GHz), UHF/VHF (AM/FM/TV Broadcast), Cellular (800 MHz), PCS (1.9GHz), paging (150/400/900 MHz) as well as in-building wireless 802.11 a/b/g). He is also thoroughly familiar with transmission characteristics of various channels and the tradeoffs in power management, modulation and encoding schema and reception techniques. Among the engagements he have supported spanning these technologies include:

- Design and implementation management of C and Ku-band satellite networks using TDMA & FDMA access methods for the United Nations and Citigroup ( 1988-1995)
- Rooftop Satellite Systems Deployment for Data and TVRO applications for BMG and various Financial Services Firms ( 1991)
- Design and Implementation Management of Digital Page/ Radio –based Alerting System for Con-Edison and Power Authority of the State of NY (Indian Point); this included Radio frequency selection and radio control system design, based on frequency allocations, availability of base station and repeater, and path profile calculations.(1979-1982)
- Design and Implementation of 2-way digital TDMA Land Mobile Radio system ( GPS-capable) for Governors Island NYC ( 2010)
- Design and Implementation management of Satellite Antenna Farm and LOS Microwave Back-up Links for Major Newspaper Worldwide Publishing Network ( 2005-2006)
- Expert Witness support in VSAT Ku- band deployment litigation ( 1993-95)
- Expert Witness support in Breach of Contract suit for Air-to-Ground in-Flight Communications Systems(1994 – 1998)
- Rooftop Site Management, Survey and Upgrade Plans for Metropolitan Life Real Estate (multiple Properties) ( 1992-95)
- Numerous In-building Wireless Systems deployments using Wi-Fi 802.11a/b/g technology (university, corporate and Health care applications) including coverage /capacity analysis, security , hardening and integration with existing LAN infrastructure ( 2005-2015)
- Analysis of use of cellular data communications systems for Back-up and Recovery links to traditional wire line facilities ( 1985-89)

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### Curriculum Vitae

- Design and Implementation Management of LOS Microwave and Point-to-point Infrared High Speed Communications Links for various corporate, institutional and Government applications ( 2000-15)

### Litigation Support Experience

Mr. Occhiogrosso served as an expert witness in various cases for several high-tech corporations encompassing patent infringement, trade secrets, product malfunctions Class Action for Service Level Agreements and breach of contract. Detailed technical subject matter encompassed the following disciplines:

- Voice digitization/voice processing
- Voice over Internet Protocol (VoIP)
- Voice Mail and Electronic messaging
- Automatic Call Distribution (ACD) & Interactive Voice Response (IVR) Systems
- Cellular telephony and data communications
- Air-to-ground communications (S/L Band)
- Satellite communications (C and Ku Band)
- Telephone switching systems
- Predictive/ progressive dialing systems

A summary of major cases he has supported as either a testifying or consulting expert witness follows:

Type of Matter:	Class Action Lawsuit regarding CO-based System Performance of Voice Mail services
Client Law Firm:	<b>Stewart and Irwin P.C. - for Class</b> ( Marion County Circuit Court, Indiana)
Case Name:	Class v. Ameritech
Services Provided:	Reviewed and analyzed extensive amount of documentation; provided <b>consultative expert assistance and deposition testimony</b>
Disposition:	Case was settled favorably for our side (the class)
Date:	2003-2004

Type of Matter:	Patent Infringement (IDDD Blocking for Public Pay Telephones)
Client Law Firm:	<b>Baker Botts LLP (Houston TX) - for SWBT</b>
Case Name:	Gammino v. SWBT (US District Court for the Northern District of Texas, Dallas)
Services Provided:	Patent infringement & Invalidity Analyses, rendered <b>Expert Reports</b> and <b>provided deposition Testimony &amp; Court Testimony at a Markman Hearing</b> for Payphone Blocking patents (Instrument and CO based)
Disposition:	Case was decided in favor of our client SBC Communications/ SWBT; and upheld on appeal
Date:	2006-2007

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### Curriculum Vitae

Type of Matter: Patent Infringement (VoIP Telephony and Wireless)  
Client Law Firm: **Steptoe & Johnson LLP (Washington DC) - for Vonage**  
Case Name: Vonage v. Verizon (US District Court for the Eastern District of Virginia, Alexandria)  
Services Provided: VoIP Patent infringement, Enablement & Invalidity Analyses, **rendered Expert Reports, was deposed & provided Expert Testimony at Trial** for VoIP/Wireless patents  
Disposition: Of the 3 patents in a 7 patent portfolio (that we handled) which Verizon alleged Vonage infringed, we assisted S&J In getting 2 patent infringement allegations withdrawn; Infringement Verdict against Vonage was overturned on Appeal for a third Wireless patent. Case subsequently settled.  
Date: 2006-2007

Type of Matter: Recapture of PE & O Insurance payout for IVR System Patent License  
Client Law Firm: **D'Amato Lynch (NYC) - for AIG**  
Case Name: AIG Specialty Lines v. American Century (US District Court for the Southern District of New York, New York City)  
Services Provided: **provided Expert consulting services** with respect to Computer telephony integration, IVR Systems Development and call center technology  
Disposition: Client sued and recovered Policy benefit payout from IVR developer  
Date: 2004-2007

Type of Matter: Patent Infringement ( Cellular Telephony)  
Client Law Firm: **Hogan Hartson LLP (Los Angeles)** – for Kyocera Wireless Corp.(KWC)  
Case Name: MLR v. KWC (US District Court for the Southern District of California, San Diego)  
Services Provided: On behalf of a Telecommunications Electronics Manufacturer in Wireless and Cellular Telephony & Data communications, **performed Patent Infringement, & Invalidity Analyses on a 5 patent portfolio**  
Disposition: Case was settled favorably for our side (KWC)  
Date: 2006-2007

Type of Matter: Class Action Lawsuit regarding Junk Digital Fax (TCPA 1991 & JFPA 2005)  
Client Law Firm: **Phillips Murrah P.C. - for AAF&R ( Oklahoma City, OK)**  
Case Name: Class v. All American Fitness & Racquetball Centers Inc. ( AAF&R) (Oklahoma County Circuit Court, OKC)  
Services Provided: Reviewed and analyzed extensive amount of documentation; provided **consultative expert assistance and expert report**  
Disposition: Case was settled  
Date: 2008

Type of Matter: Patent Infringement ( Specialty Communications Cabling & Wire)  
Client Law Firm: **LaRiviere, Grubman & Payne, LLP ( Monterey CA)** for Monster Cable  
Case Name: Audiovox Corp. v Monster Cable Products Inc. & Counterclaim (US District Court for the Eastern District of New York)  
Services Provided: Reviewed and analyzed extensive amount of documentation; provided **consultative expert assistance and expert report**  
Disposition: Case was settled  
Date: 2008

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### Curriculum Vitae

Type of Matter: Patent Infringement ( VoIP & Mobile Telephony)  
Client Law Firm: **Ropes & Gray LLC**( New York) for Rebtel  
Case Name: Stanacard, LLC v Rebtel Networks, AB & Rebtel Mobile, Inc. (US District Court for the Southern District of New York, New York City)  
Services Provided: Reviewed and analyzed extensive amount of documentation; provided **consultative expert assistance and expert report**  
Disposition: Case was settled favorably for our side  
Date: 2008-2010

Type of Matter: Copyright Infringement re: Digital Ringtones for Mobile Telephony  
Client Law Firm: **Lovells LLC** (New York) for ASCAP  
Case Name: United States of America v ASCAP (US District Court for the Southern District of New York, New York City)  
Services Provided: Reviewed and analyzed extensive amount of documentation; provided **consultative expert assistance**  
Disposition: Case resolved  
Date: 2009-2010

Type of Matter: IP Indemnification to Recapture of Payments for RAKTL Patent Portfolio License(s)  
Client Law Firm: **Bryan Cave (Atlanta,GA) - for AFLAC**  
Case Name: American Family Life Assurance Company of Columbus v Intervoice, Inc. (US District Court for the Middle District of Georgia, Macon Division)  
Services Provided: Provided Expert consulting services with respect to IVR Systems Deployment, Computer telephony integration, and call center technology; performed **infringement Analyses for IVR applications patents, rendered Expert Reports & was deposed.**  
Disposition: Case was resolved in Intervoice's favor and decision was subsequently upheld on appeal based upon intellectual property infringement indemnification clauses in Purchase Agreement between the parties.  
Date: 2010-2014

Type of Matter: Patent Infringement re: Call blocking for cellular telephony  
Client Law Firm: **K&L Gates LLC ( Boston MA), representing Sprint**  
Case Name: Gammino v. Sprint Communications Co., Sprint Spectrum L.P., Nextel Operations, Inc. & Virgin Mobile USA L.P. ( US District Court for the Eastern District of Pennsylvania)  
Services Provided: Reviewed and analyzed extensive amount of documentation; provided consultative expert assistance ; provided tutorial to court on cellular technology; testified at Markman hearing  
Disposition: Case was resolved in Sprint's favor for Non- infringement and this was upheld on appeal.  
Date: 2011 – 2013

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Type of Matter:	Patent Infringement re: Captioned Telephony
Client Law Firm:	<b>Baker Botts LLP (Austin TX), Akin Gump (NY NY) and Maschoff - Brennan</b> all representing Caption Call LLC and Sorenson Communications
Case Name:	<i>Ultratec, Inc. v. Sorenson Communications</i> , U.S. District Court for the Western District of Wisconsin, Case No. 3:13-cv-00346
Related Proceedings:	Petition for <i>Inter Partes</i> Review denied by Patent Trial and Appeals Board in the following proceedings: IPR2013-00540 through 00545, as well as 00549, 00550, IPR 2013-00288 and IPR2014-00780. IPR2015-00636,00637, IPR2015-01355 and 01357 through 01359, IPR2015-01886 and 01889, Petition for <i>Post Grant</i> Review denied by PTAB in PGR2016-00037
Services Provided:	Reviewed and analyzed 20 patents in suit (dozens of claims), numerous pieces of prior art; Rendered expert reports on Invalidity and Non – Infringement of Ultratec patents; Rendered expert reports on Validity and Infringement of Sorenson patents; Testified at trial; Deposed in both litigation and related IPR proceedings.
Disposition:	Re: CaptionCall patent – the PTAB determined the claims in the patent to be invalid and CaptionCall’s infringement claims were withdrawn.
	Re: Ultratec’s patents - Case was resolved initially in Ultratec’s favor on Summary Judgement and for the remaining claims at trial with CaptionCall found to Infringe valid claims and Ultratec awarded damages. Subsequently nearly all claims in suit were found to be Invalid by the PTAB, and the case(s) have been stayed pending final resolution of the PTAB’s decisions. The IPR decisions of the PTAB - finding in favor of CaptionCall are presently being appealed by Ultratec.
Date:	2013 – present
Type of Matter:	Patent Infringement re: Call Management and Softswitches
Client Law Firm:	<b>Cooley</b> , representing Broadsoft
Case Name:	Broadsoft v Callwave (Case No. 1:13-cv-00711-RGA)
Services Provided:	Invalidity Analysis of asserted patents provided expert reports on invalidity, deposition and also declaration in summary judgement motion for invalidity on a subset of the claims. Technology involved caller ID spoofing, ANI and sequential and simultaneous ring protocols
Disposition:	Case is ongoing, summary judgement motion pending
Date:	2015- 2019
Type of Matter:	Patent Infringement re: Prison Telecommunications Systems
Client Law Firm:	<b>Bragalone &amp; Conroy</b> , representing Securus
Case Name:	Securus Technology v Value – Added Communications
Services Provided:	Invalidity Analysis of voice mail patents in prison resulting in a petition for IPR against the patent owner.
Disposition:	IPR petition prepared, unfiled
Date:	2016- 2017

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Type of Matter: Patent Infringement & Validity Analysis re: Digital Recording  
Client Law Firm: **Fox Rothschild**, representing Verint  
Case Name: Verint Systems v Red Box recorders (USD SNY 1:14-cv-05403-SAS)  
Services Provided: Infringement Analysis of Defendant Technology (6 patents) and Validity Analysis of Plaintiff's patents (against 31 pieces of prior art), Expert reports, deposition and declaration in a motion for summary judgement in 101 Alice proceedings.  
Disposition: Case was settled: defendant took out licenses for all asserted claims from Verint's IP licensing entity , the Open Innovation Network  
Date: 2016-2017

Type of Matter: Patent Infringement & Invalidity Analysis re: VoIP Switching  
Client Law Firm: **Fish Richardson**, representing Metaswitch  
Case Name: Sonus Networks v Metaswitch Networks Ltd (C.A. NO2:18-CV-00057RWS).  
Services Provided: Invalidity Analysis of Asserted patents, IPRs filed  
Disposition: Case was settled; IPR terminated  
Date: 2018-2019

Type of Matter: Patent Infringement re: Call Center  
Client Law Firm: **DLA Piper**, representing Call Miner  
Case Name: NICE Ltd.et al. v. Cal/Miner, Inc. (C.A. No.18-02024-RGA (USDC D. Del.)  
Services Provided: Invalidity Analysis of Asserted patents  
Disposition: Ongoing , with IPRs filed  
Date: 2019 -present

Type of Matter: TCPA Violation  
Client Law Firm: **Bursor Fischer** representing Lorenzo Quintana et al  
Case Name: Quintana et al v BB&T Co. Case No. 1:18-CV-00748-WO-JLW)  
Services Provided: Expert Analysis of Predictive Dialer technology  
Disposition: Ongoing  
Date: 2019 -present

Type of Matter: Defense of Patent Owner in **IPR Proceedings**  
Client Law Firm: **Mintz Levin** representing Parus  
Case Name: IPR 2020-00686-7 & IPR 2020-00846-7  
Services Provided: Expert Analysis of Voice Browser Technology  
Disposition: Ongoing  
Date: 2019 -present

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### Curriculum Vitae

#### **Professional Affiliations, Achievements & Awards**

- Institute of Electrical & Electronics Engineers (IEEE)
- Association for Computing Machinery (ACM) ( former)
- Society of Telecommunications Consultants (STC) (former)
- Health and Information Management Systems Society (HIMSS) (former)
- Communications Managers Association (CMA) Consultant Partner (former)
- Electronic Industries Association (EIA) ( former)
- Association of Old Crows (AOC) (former)
- Wall Street Technology Association (Author/Speaker)

#### **Publications**

Mr. Occhiogrosso was the sole, primary or contributing author to the following works encompassing a variety of technical subject matter which appeared in industry publications, technical journals, and chapters in technical text books or as a provisional application for a US patent.

##### **Voice Mail, Digitized and Packetized Voice Systems**

1. "Human Factors Considerations in the Design of Voice Mail Systems," Second International Symposium on Computer Message Systems. Washington D.C., September 1985.
2. "Voice Mail Technology Comes of Age Part I and II," Telephony, September 1984.
3. "Voice Store and Forward: A Rapidly Maturing Technology," Proceedings of ELECTRO '84. Boston, Massachusetts, May 1984
4. "Issues in Packet Voice Communication," Proceedings of IEEE, August 1979.
5. "Digitized Voice Comes of Age: Part II Techniques," Data Communications, April 1978.
6. "Digitized Voice Comes of Age: Part I Tradeoffs," Data Communications, March 1978.

##### **Local Area Networks (LAN)**

"LAN vs. PABX?" in Local Area and Multiple Access Networks. Computer Science Press, edited by R.L. Pickholtz, 1986.

##### **Network Analysis & Design**

1. "Analysis and Design of Hybrid Switching Networks," IEEE Transactions on Communications, September 1981.
2. "Packet Switched Voice and Data Networks Advantages and Costs," Telecommunications, December 1978.
3. "Economic Analysis of Integrated Voice and Data Networks: A Case Study," Proceedings of the IEEE, November 1978.

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### **Curriculum Vitae**

4. "Design of Hybrid Switched Networks for Voice and Data," Proceedings of the International Conference on Communications, June 1978.
5. "Performance Analysis of Integrated Switching Communications Systems," Proceedings of the National Telecommunications Conference. Los Angeles, California, December 1977.

### **Data Center Design and Engineering**

1. "Maximizing Uptime for Mission Critical Applications", Development NY, May 2004
2. "Data Center Design and hardening tips", Development NY, May 2005
3. "New Challenges in Data Center Design and Hardening", Development NY, May 2006
4. "An Economic Imperative: Reducing Data center Expenses", Perspective NY, October 2008\*

### **Disaster Recovery**

1. "Business Continuity and Disaster Recovery in an Age of Heightened Awareness", Development NY, April 2003
2. SOS: Selected Observations on Sandy ... A Technology Perspective, Perspective NY, Mission Critical Issue, 2013

### **In-Building Wireless**

1. "The Ins and Outs of Building Wireless", Development NY, September 2004
2. "In-Building Technology: IP Convergence, Rise of Wireless & Building Emergency Communications", NYC Real Estate Expo, November 2010

### **Physical Security**

1. "Safety and Security Retrospective: 5 Years after 9-11", Development NY, September 2006
2. "Growing Impact of Information Technology (on Security)", Development NY, November 2005
3. "IT Trends in Healthcare: The effect of EMRs on Hospitals", Perspective NY, Spring 2008

### **Internet of Things (IoT) Smart City/Smart Buildings/Energy/Transportation**

1. "IoT Considerations, Requirements, and Architectures for Smart Buildings – Energy Optimization and Next Generation Building Management Systems", IEEE IoT Journal, February 2017
2. "Internet of Things (IoT)-based Apparatus And Method For Rail Crossing Alerting Of Static Or Dynamic Rail track Intrusions", Proceedings of Joint Rail Conference (JRC), April 4-7, 2017, Philadelphia, PA
3. "An Overview of IoT Technologies and Solutions for Smart Cities". Chapter in Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, Wiley/IEEE Press, to be published in 2018
4. "The Emerging Energy Internet of Things", Chapter in Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, Wiley/IEEE Press, to be published 2018
5. "Distributed Sensor Systems: Mobile IPv6, Proxy MIPv6, and Related Protocols for Crowd-sensing Applications in Smart Cities Environments" (submitted to Conference & Expo on Emerging Technologies for a Smarter World (CEWIT2017))

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### **Curriculum Vitae**

6. “Practical Aspects for the Integration of 5G Networks and IoT Applications in Smart Cities Environments”, Journal of Wireless Communications and Mobile Computing, August 2019

### **Internet of Things (IoT) E-health and Insurance**

1. “Security Considerations for IoT Support of E-Health Applications”, Chapter in Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, CRC Press, 2017, ISBN 9781498778510
2. “IoT Considerations, Requirements, and Architectures for Insurance Applications”. Chapter in Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, CRC Press, 2017, ISBN 9781498778510.
3. “IoT Security (IoT Sec) Mechanisms For e-Health and Assisted Living Applications “ (2<sup>nd</sup> IEEE/ACM International Workshop on Safe, Energy-Aware & Reliable Connected Health (SEARCH 2017))

### **Internet of Things (IoT) Security**

1. “System and Method for a uniform measure and assessment of an institution’s aggregate cyber security risk and of the institution’s cybersecurity confidence index“ (submitted as Non – Provisional Application 15/296,005 to the United States Patent & Trademark Office (USPTO), October 17,2016)
2. “IoT Security (IoT Sec) Considerations, Requirements and Architectures”, 14th IEEE Annual Consumer Communications & Networking Conference (CCNC), January 2017, Las Vegas, NV
3. “Blockchain-enabled Fog and Edge Computing: Concepts, Architectures and Smart City Applications”. Chapter in book: Blockchain-enabled Fog and Edge Computing: Concepts, Architectures and Applications, Editors: M. H. Rehmani, M. M. Rehan, CRC Press, Taylor & Francis Group, 2020. Boca Raton, Fla

### **Emerging IoT Applications**

1. “Issues in Multimedia IoT Systems and Applications”, IEEE IoT TsC (Transactions on Service Computing), the IoT Forum and IPv6 Forum (collocated with the IoT Week), June 2017, Geneva, Switzerland.
2. “Energy – efficient IoT- based “Black Box” for Aeronautical and other applications (submitted to Consumer Communications & Networking Conference (CCNC),2018 related to Vehicular Communications and Applications in Water, Land, and Sky)
3. “A Review of Wireless and Satellite-based M2M Services in Support of Smart Grids” 1st EAI International Conference on Smart Grid Assisted Internet of Things (SG IoT 2017) July, 2017, Sault Ste. Marie, Ontario, Canada
4. “IoT-Driven Advances in Commercial and Industrial Building Lighting”, Chapter in Industrial IOT, Editor: I. Butun, Springer Nature, 2020, ISBN 978-3-030-42500-5
5. “Situational Awareness for Law Enforcement and Public Safety Agencies Operating in Smart Cities”; to appear as a chapter in Springer’s book : IoT and WSN based Smart Cities: A Machine Learning Perspective.